SCIENCE AS CULTURAL PRACTICE
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ABSTRACT: This paper is a contribution to the contemporary understanding of science, which is crucial for understanding the world and humanity. This understanding is the task of philosophy and consists, according to the conception defended by the author, in the understanding of scientific practices. The author gives an account of the turn towards an analysis of scientific practice(s) within contemporary philosophy of science. Based on this, he outlines the concept of science as a sociocultural practice, which itself is conceptualized as two mutually intertwined forms of transactions: causal transactions within natural reality (natural and technical sciences), and meaningful transactions within sociocultural reality (social and human sciences).

Keywords: science, pragmatism, philosophy of science, scientific practice, cultural practice, John Dewey

1. Introduction: The Problem of Science Today and the Need for a New (Pragmatist) Philosophy of Science

The title of my paper might, at first sight, invoke two kinds of reaction: First, what nonsense is this? How could science be cultural practice? Or, second, what banality is this? Who would think of science as anything else? In reply, my claims are as follows: Science has always been cultural practice, but, alas, we have not always understood it this way. And if science is understood this way, what does that mean? Be that as it may, *the pragmatist conception of science as cultural (or sociocultural) practice* has not been common sense, nor has it been widely accepted. And this is why I want to delve into this issue here.

Science is plainly seen as a key phenomenon in the contemporary world, influencing human lives in an unprecedented way. Even more importantly, it has the potential to radically change the human future. On the other hand, science – in combination with technology (the 4th industrial revolution) and, for that matter, under the direction of certain type(s) of politics – could bring humanity to the brink of equally radical *existential risks*. Thus, despite the longstanding efforts of philoso-

phers to understand science, these issues are even more pressing today and require the attention of us pragmatists. John Dewey was already reflecting on this complex situation as early as 1949 (LW 16, 369–382) when he wrote about "the ambiguity, the two-facedness, of science with respect to good and evil in human life". By way of an answer, while rejecting the idea that science is irrelevant to human affairs as such, he proposed "to bend every effort to obtain the kind of knowledge still lacking" – that is "the absence of a knowledge genuinely humane". This absence is to be overcome with the decisive support of philosophy and intelligent politics. And this, according to Dewey, is the crucial intellectual work which "needs to be done". In the end, he called for "a definite change in the direction of philosophical inquiry" in much the same vein as what would become one of the key provocations put forth by Richard Rorty some decades later.

Thus, I want to stress that *science itself is a problem* – not just the solution to all human problems – and that scientific developments present new, serious problems for humans and society. Therefore, the crucial question for our days is this: *how do we see science?* How do we understand it and interpret it? My paper focuses on the pragmatist understanding of science as a kind of cultural practice based on contemporary pragmatist conceptions of practice and culture. Science, technology, politics and philosophy (even ethics) are things we humans practice in various kinds of historical, cultural ways and forms (or patterns). The pragmatist conception of *cultural (or sociocultural) practices* seems to me to offer great promise for conceptualizing science as a phenomenon that is decisively shaping humanity.

2. The Pragmatist Conception of Practice(s)[1]

Let me start with an outline of a pragmatist philosophical theory of practice. It is not identical to the pragmatist

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[1] In this section I draw on my chapter "Action, Practice, and Theory: Toward Pragmatist Philosophical Framing of Practice Theory", in Anders Buch and Ted Schatzki, eds., 2018. *Questions of Practice in Philosophy and Social Theory.* New York and London: Routledge, 31–48.

concept of human action, although we lack precise and definite criteria for drawing a line between actions that are practical, and actions that are not. The *pragmatist concept of practice* is an expression of a pragmatist concept of the human being as a practical being. According to pragmatism, everything humans do is a kind of practice and, in particular, a kind of social practice, because all human existence is both practical, in the sense that it includes doing, as well as the social, in the sense that it always includes social aspects. There is no such thing as an "impractical human being" or complete "social isolation". Humans must interact with their environments in order to survive. These interactions comprise human agency, which is physical, real, and empirical. The necessary agency of a "practical enterprise" (LW1, 5) aligning its capacities with the requirements of its condition makes it practically necessary to adapt to nature whilst adapting nature to human needs. John Dewey put it as follows: "practical in its proper vital meaning is nothing more nor less than the whole conduct of life with respect to the medium, physical and cultural, in which one lives" (Dewey 2012, 218). Dewey's ontology, abolishing the traditional dualism of nature as object and human as subject, captures this human condition through the concept of experience. Life is practical, through and through. We practically interact with the world and among ourselves. This does not mean that we cease to be "rational animals," but that our thinking, mental activity, and intelligence are also primarily practical, even if not in the sense that they must serve action. Rather, they are practical in the sense of dealing with life-issues. These are the issues we have to deal with, provided we want either to survive or to live a good life.

This starting point in pragmatism – known as the "practical starting point" (PSP)[2] – does not take practice as the final tribunal of all human efforts, examining their "practical consequences" and inquiring as to whether they make a "practical difference" or show "practical utility". Neither does it consider practice (however defined) to be the exclusive meaning of life (Bernstein 1971, 174). Last but not least, the pragmatist "principle of practice" is anti-dualistic and opposes elevating practice over theory or identifying the practical "solely with physical or mundane labors" (LW4, 223–227). Pragmatism, like any philosophy, is a distinct way of thinking–an intellectual practice – for which "Meaning, Truth, Value, Inquiry, Knowledge, and Action" are the dominant concerns (Thayer 1981, 15). Whether we make practice (within nature) the starting point or maxim or ultimate reality, it should be clear that:

> One major characteristic of pragmatist thought is that pragmatists turn their attention to human practices and habits. Philosophical views and concepts are examined in such practical, experiential terms. However, this is not to say that practice is "prior to" theory; rather no sharp dichotomy between theory and practice is presupposed in the first place. Even the most scientific and philosophical matters are examined in the light of their potential connections with human practical action. (Pihlström 2011, 2)

If there is any meaningful priority of practice, it "is neither in temporality nor in ontology but in functionality. Practice is a test of a theory's value for our practices or habits, which, after all, are constitutive of our lives" (Pihlström 2011, 38).

What, then, is practice according to pragmatism? There are three concepts (at least) that may serve as the foundation of the pragmatist philosophical theory of practice: *experience*, *habit*, and *transaction*. All of them fit into the "ontological-anthropological" anti-dualist turn, with which the concept of practice is to be developed in accordance as an ontological concept alongside the traditional epistemological (and mentalistic) concepts employed in theory of knowledge. Indeed, the concepts of theory, knowledge, truth, value, meaning, inquiry, and so forth, are better framed through the concept of practice, or practices. Thus, the counterparts for developing the pragmatist concept of practice could also be the Wittgensteinian concept of "forms of life" or the Heideggerian concept of "being-in-the-world." Such a strategy even brings the pragmatist concept of practice

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[2] The phrase was coined by Browning (1998) and has since been adopted by contemporary pragmatists in general. It is developed in more detail in the work of Hildebrand (2003, 70–74).

closer to the theoretical concepts of Bourdieuan practice. From the pragmatist philosophical viewpoint, human practice may be conceptualized via the concepts of experience, habit, and transaction either analytically or synthetically; that is, each of them may serve as the basis for a pragmatist philosophical theory of practice, or they may be taken together as explicating various aspects of practice: experiential, habitual, and transactional. In other words, human life practice may be understood as experience or as habit or as transaction or as all of these in unity. Seeing the former as practice gives them active, existential, social, and transformative dimensions.

I contend that the most promising option for the pragmatist philosophy of practice is the concept of *transaction* (Dépelteau 2015). It derives from pragmatist ontological holism and interactionism which hold that all reality is a network of interconnections. But transactionism both includes and transcends interactionism when it comes to social practices, which function not only in the context of organism-environment interactions, but also in the context of human social interactions. Transactions are practical because they are relations of active interdependence and exchange between real entities. Transactions cannot be empty; there is always a mutual input/output of exchange involved. Thus, transactions are the source of coordination and of the emergence of new qualities, to which Peirce's triadic ontology may be applied. Dewey depicted the fundamental meaning of transactions in his *opus magnum* (LW 1) but developed the concept much later by distinguishing between self-action, interaction, and transaction (LW 16). Transactional ontology is an approach which holds that all that exists is what it is on account of its role within the web of transactions between social agents and their environment, as well as among social agents themselves (cf. Garrison 2001; McReynolds 2017).

The important and inseparable part of this pragmatist theory of practice is the concept of *intellectual practice*.[3] Human activities such as scientific research, artistic creation, management planning, political negotiation, pedagogical instruction, spiritual meditation, and many others, include a great part of what has been labeled as "theorizing." In their social practical contexts, they represent "intellectual practices," and "immaterial labor" is inherent to these. In terms of Deweyan ontology, they are parts of "secondary experience", whose role is to reflect on primary experience and to produce artifacts such as ideas, theories, discoveries, explanations, justifications, plans, projects, decisions, images, artworks, books, papers, mental cures, and the like. The concept of theory epitomized as a mental phenomenon, in opposition to practice, has to be abandoned in a pragmatic conception of practice. The line between intellectual and material practices is not to be drawn on the basis of an obsolete classical dualism (the difference between them lies not in the former being unpractical and the latter being practical), but by reference to their function in particular social orders.

From the point of view of (Deweyan) pragmatism, the function of "theorizing," intellectual practices, and immaterial labor is to foster the growth of human and social life. However, if the role of primary experience is existential, questions about knowledge and values immediately arise concerning how the agents of material practices know what kinds of problems they must solve, what the solutions are, what goals they ought to follow, what values they should cherish, and so forth. In order to know and to have values, they must develop practical intelligence (practical wisdom, *phronesis*) within primary experience, or engage in "theoretical reflection" and thinking within secondary experience. Note: Let us not become confused by the term "secondary." The sphere of the secondary experience is a real social sphere of life

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[3] According to Dewey (MW: 50), "we need to understand the difference between theory and practice as a difference between two kinds of practice"… The so-called separation of theory and practice means in fact the separation of two kinds of practice, one taking place in the outdoor world, the other in the study". According to Rorty (1991b, 32), the "quest for disinterested theoretical truth is continuation of practice by other means".

composed of social institutions whose mission includes all kinds of intellectual activities, from scientific research to artistic creation to philosophical thinking to spiritual services and the like. These institutions and their practices are by no means "secondary" in the evaluative sense; in order to function, they all need a relevant social organization, resources, finances, workers, managers, and so on. They perform intellectual practices whose social value is all the more pressing today in the era of the information and knowledge society.

According to the pragmatist conception of practice, everything humans do as intelligent agents is a kind of practice. Theorizing is no exception. Theorists carry out intellectual practices, whereas "practitioners" carry out material and mixed semi-material/semi-intellectual practices. All are parts of the overall web of practical social transactions, including the armchair theorist, whose goal is not to interact with material objects in the outer world, but with ideas, concepts, thoughts, and the like. What do we need for such action other than our heads, minds or brains, and our books and armchairs? These are obviously the standard social conditions of intellectual work.[4]

Thus, theory is better understood as a kind of practice: science (knowledge production) is scientific practice, education (knowledge dissemination) is educational practice, art (beauty production) is artistic practice, and so forth. All are kinds of "creative intellectual practices" which have always played a crucial role in social life and it is a role that is now growing unprecedentedly. It is important to argue that just because scientists, teachers, professors, artists, philosophers, and so on, are "theoreticians," "academics," "intellectuals," and the like, nei-

ther they nor their social institutions are "practically useless". It is the other way around: their professional practices are of the utmost practical value, one that cannot be reduced to physical, empirical, economic, or technological significance. Such a reduction would lead to the elimination of creative and intellectual potential from human practices.

Thus, human thought and knowledge can be reconceptualized in terms of social practices. Intellectualization *via* intellectual practices is moving to the forefront of human social life, which now increasingly depends on knowledge and idea-production. Even though these practices "do not bake us bread", they can, nevertheless, tell us how and where to find this bread; that is, how to survive and prosper. These are the key cultural practices – the creative intelligent practices we all depend on (more than ever).

3. Scientific Practice as Cultural Practice

So, again, what is science? The standard view has defined science as *knowledge* – the best and the highest human knowledge possible (objective, neutral, critical, verified, etc.) – while knowledge is defined as the representation of reality ("mirror of nature"), as propositional knowledge ("true justified belief").[5] In other words, this "static" (even rigid) notion of science is the extension of epistemology, and if it had anything to do with the concept of practice, it traditionally included such activities as: searching for truth and/or certainty; obtaining and collecting data; constructing theories; explaining and interpreting facts and relations; understanding discovered phenomena and discovering new phenomena; solving problems; justifying and proving claims; articulating scientific laws. These are all kinds of epistemic activities, but they were not, however, taken to be "scientific

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[4] The claims about the social organization of intellectual practices might seem obvious to someone living and working within a standard Western liberal democracy; however, the recent neoliberalization of social life, and in particular its creative intellectual spheres, puts the standards and values on which these spheres and their workers depend in jeopardy (see e.g., Ward 2012). These social issues are even more pressing in European post-communist countries like Slovakia, where creative academic workers are confronted by a mixture of neoliberal and post-communist political and economic strategies devaluing their work.

[5] Prof. Hasok Chang aptly shows in his work that in traditional philosophy of science, science has been approached mainly from an epistemological-representationalist point of view, not from an operational-praxeological practice point of view, and from an autonomist rather than a contextual cultural standpoint.

practices" until "the practice turn" came about in science studies in the 1970s.[6] Science, itself a practice, has instead been viewed as the opposite of practice (and *vice versa*). If science has anything to do with practice – is "practical" – it has to be applied, implemented, "materialized", become socially useful and relevant, and so on, as if it were outside of practice (and *vice versa*). But to acquire knowledge (producing it), there must be someone doing science practically in the practice of inquiry.[7]

The pragmatist philosophical understanding of science as practice (social and cultural) has, however, a slightly longer history. It is rooted in Peirce's anti-Cartesian concept of the scientific method of inquiry which is always social inquiry; following James's anti-positivistic, pluralistic, and humanistic image of cultural practices in which science has no privilege over other social practices (philosophy, arts, religion, common sense); and culminating in Dewey's instrumentalist embeddedness of science in experience. "According to Dewey's pragmatism, scientific experience is neither elevated and holy nor qualitatively different from experiences people have in their daily lives. Science is always linked to the ordinary qualitative world... and simply represents a concentrated collection of tools that people have developed together in order to master and improve the world" (Brinkmann 2013, 151). These fundamentals were famously and more systematically developed by Kuhn when he attributed historicity to science development and described the socio-cultural mechanisms of its functioning. For Rorty (1991a), science is in no way natural, which means it is a socio-cultural construction on a par with other human inventions. Echoing Nietzsche, all science is "human, all too human", and not an objectivist enterprise producing results that are universally valid for all humans in all times and places. Science itself changes and reflects and concerns various kinds of human interests (including political ones).

Is there anything special about scientific practices in relation to all other human practices? What they have in common is that they are all socio-cultural practices and come in two basic (ontological) forms: 1. Practices in which humans are in causal transactions with nature, and 2. Practices in which humans are in mutual meaningful transactions between themselves. In other words, according to the transactionist paradigm as outlined above, human life practice is to be re-conceptualized as the intersection of practical transactions: (1) between humans and nature (which are causal and primarily nonlinguistic), and (2) between humans and humans (which are meaningful and primarily linguistic). What we have to deal with here are sets of *nonlinguistic causal practices* and of *linguistic meaningful practices*. The complexity of this situation is that these sets of practices overlap; for instance, nonlinguistic practices are substantially mediated by linguistic ones. Humans are intentional socio-cultural agents and so it is through language that they mediate the practices through which they cope with natural causal transactions. Causal nonlinguistic transactions between humans and nature are life-transactions that decide the human lot, but their processes and outcomes depend on meaningful linguistic practices intervening between humans and humans.[8] Both kinds of practices also mutually transact in such a way that practices based on meanings serve as the instruments for practices based on causality.[9]

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[6] For a conception of science as practice see e.g., Pickering (1992; 1995).
[7] This is the focus of the work of such recent authors in the philosophy of science as Joseph Rouse (2002) and Hasok Chang (2011), founding and active members of the Society for Philosophy of Science in Practice (SPSP) since 2006.

[8] This is analogous to Dewey's two kinds of experience: primary and secondary. Within primary experience humans transact with nature through their habits and practices that are causal. Within secondary experience humans transact with nature through their habits and practices that are meaningful. The overall purpose of primary experience is human survival, whereas the purpose of secondary experience is the reflection of the primary experience through intellectual means in order not only to make survival more efficient, but also to make it richer and consummatory.
[9] In this context, we can explain the unfortunate dualism between experience and language, or between Dewey and Rorty (classical pragmatism and neopragmatism). Rorty may have neglected the concept of experience in his desire to replace it with the concept of language; nevertheless, he did use the pragmatist concept of practice, such as the concept of linguistic practice. Moreover, he outlined the pragmatist concept of cultural practices epitomized by philosophy as cultural politics. It is understandable that Rorty himself focused only on "internal"

The concept of scientific practice itself also has two basic forms: 1. Scientific practices that involve and inquire into causal transactions with natural reality (natural and technical sciences), 2. Scientific practices that involve and inquire into meaningful transactions with socio-cultural reality (social and human sciences). Of course, the two forms include both of these, albeit in different measures. Natural and technical sciences (empirical, experimental), which function based on understanding and executing causal transactions, use meaningful transactions as their instruments as well. While human and social sciences, which function based on understanding and executing meaningful transactions, use causal transactions as their instruments as well. Thus, this division between the two kinds of practices should not be seen as absolute, in much the same way as the relative divide between nature and culture is not absolute. Nature provides the ontological framework within which any culture can originate and develop, and all culture is part of nature, but the natural/cultural distinction is given by the distinction between the non-linguistic/linguistic and causal/meaningful transactions humans conduct with the former (nature) and within the latter (culture). This is where the line between the two kinds of human transaction can be drawn, but it does not exclude either their meaningful and linguistic transactions with nature or their causal and non-linguistic transactions among themselves. And this is why human transactions with nature are impossible without culture and outside culture, just as transactions between humans are impossible without and outside nature. All scientific practices have these two dimensions, and so the absolute division between natural/technical and social/human sciences should finally be abandoned.

It is not enough to understand science as practice in its technical and technological meaning. Culture itself is

a set of practices (Brinkmann 2013). In pragmatism all human practices are social and cultural, including the practices of natural and technical sciences. On the one hand, every science is and can only be part of culture as a human invention. Science is embedded in culture, the science-culture relationship is internal, not external. Culture provides not only a background or framework for science, which cannot develop any other way than within human culture because all science is human science and nothing more. According to Dewey (2012), culture is all that is the result of human practices within nature; that is, it is humanly "transformed nature". Science is one of the key practical factors in these transformations, while culture is a part of every science-as-practice, and in this respect, we speak of "scientific culture" as a way of doing science.

So, what does the phrase "all science-as-practice is cultural practice" mean? One important characteristic of this pragmatist philosophy of science-as-cultural practice is *historicism*. There is no such thing as a universal and united science; instead, science developed within its historical forms, that is, in a plurality of sciences that both developed historically within societies and cultures and that have been maintained within those societies and cultures. Thus, the criteria for "demarcating" science from non-science (or anti-science) are also historical (and one of the best pragmatist images of the history of science was famously provided by Kuhn).

Another characteristic – the most important one – is the *value-ladenness and normativeness* of science-as-cultural practice. It is not possible to have culture without values and norms.[10] Consequently, we cannot have scientific practice without values and norms. Values – epistemic and non-epistemic, cognitive and non-cognitive, scientific and non-scientific – are inherent to all scientific practice and not brought in from the external context, as pragmatists from Dewey to Putnam have always argued. Brinkmann (2013, 61) writes: "We know

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(horizontal) human transactions, i.e., transactions based on meanings, and in particular linguistic meanings, since he saw them as having a crucial mediatory role in all (vertical) human practices. Moreover, Peirce was also interested in the meanings of actions and practices, not only in the meanings of linguistic structures.

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[10] I discriminate between values and norms, but there is insufficient space to discuss the difference here.

something about the world by doing something with it. If we do something good with it, we acquire valid knowledge that can help us solve our problems and move us forward in our life process… Science is not, as the positivists believed, free of values, for value is characteristic of all practical action inasmuch as values are involved in the execution of these activities…" in every way, for good or for bad. This axiological dimension of scientific practice is an inherent part of the pragmatist philosophy of science. We cannot overlook the fact that science as practiced always depends on the culture within which it is practiced. The role of philosophy of science is to "make explicit" the cultural values and norms which frame science-as-practice.

4. Conclusion: Science as Cultural Value

The key philosophical question concerning science, its social mission and progress, is its value for humanity. What is all science good for? From the pragmatist stance, this question cannot be answered beyond the culture and cultural meaning within which all science is practiced and developed. The goals of science are the goals it takes on from and within culture (or cultures) and its (their) values. One example of the cultural value of science is *scientism* or science for science's sake. To reply that the meaning of science is genuine knowledge is no solution, for the same question applies here too: what is the meaning of knowledge? Why and for what do we need knowledge? Even replies such as "Knowledge for knowledge's sake" have their cultural roots in the ancient value of theory as "contemplative practice". But in the modern era, first, science has become the universal tool for social and human progress and, second, scientific progress itself has become the universal goal of social and human progress, as if science has to guarantee humanity that all its other goals and desires will be fulfilled.[11] From the pragmatist philosophical point of view, this appears to be very like "science-as-ideology" or even "science-as-mythology". Perhaps we should go back to Jean-Jacques Rousseau and again ask the Academy of Dijon the (somewhat rephrased) question to which he ventured a reply: "Has the progress of the sciences and arts – that is of culture – contributed to the moral progress of humanity?" If we do not understand and describe science as cultural practice, there is no way we can reply.[12]

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[11] Cf. the Slovak Academy of Sciences' slogan: "Science is the future, the future is science!"

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